



SEQUENCE LISTING

<110> Kawasaki, Hiroaki
Graybiel, Ann
Housman, David

<120> Genes Integrating Signal Transduction Pathways

<130> MIT-103

<140> US 09/422,999

<141> 1999-10-22

<150> US 60/105,507

<151> 1998-10-23

<150> US 60/108,685

<151> 1998-11-16

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<170> PatentIn version 3.3

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Ile Glu Ala Phe Asp Asp Ser Gly Lys Val Arg Asp Pro Gln Leu Val
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His Val Ala Glu Lys Leu Leu Gln Leu Gln Asn Phe Asn Thr Leu Met	
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Arg His Cys Lys Ala Leu Ile Leu Gly Ile Tyr Lys Gln Gly Leu Lys				
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 Met Ala Gly Thr Leu
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 Asp Leu Asp Lys Gly Cys Thr Val Glu Glu Leu Leu Arg Gly Cys Ile
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 Glu Ala Phe Asp Asp Ser Gly Lys Val Arg Asp Pro Gln Leu Val Arg
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 Met Phe Leu Met Met His Pro Trp Tyr Ile Pro Ser Ser Gln Leu Ala
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 Ala Lys Leu Leu His Ile Tyr Gln Gln Ser Arg Lys Asp Asn Ser Asn
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Glu Leu Lys Ala Leu Leu Asp Gln Glu Gly Asn Arg Arg His Ser Ser	
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Leu Ile Asp Ile Asp Ser Val Pro Thr Tyr Lys Trp Lys Arg Gln Val	
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Val Thr His Gly Cys Thr Val Asp Asn Pro Val Leu Glu Arg Phe Ile	
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Lys Pro Thr Ala Pro Gln Arg Ala Leu Val Ile Thr His Phe Val His	
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His Ser His Val Ser Pro Glu Thr Ile Lys Leu Trp Glu Gly Leu Thr	
265 270 275	
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Glu Leu Val Thr Ala Thr Gly Asn Tyr Gly Asn Tyr Arg Arg Arg Leu	
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Pro	Asp	Leu	Leu	Ser	Leu	Leu	Thr	Val	Ser	Leu	Asp	Gln	Tyr	Gln	Thr	
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Ser	Ser	Pro	Thr	Ser	Pro	Thr	Ser	Cys	Thr	Pro	Pro	Pro	Arg	Pro	Pro	
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Val	Leu	Glu	Glu	Trp	Thr	Ser	Ala	Ala	Lys	Pro	Lys	Leu	Asp	Gln	Ala	
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Leu	Val	Val	Glu	His	Ile	Glu	Lys	Met	Val	Glu	Ser	Val	Phe	Arg	Asn	
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Gln	Glu	Ser	Asn	Ser	Leu	Arg	Pro	Val	Ala	Cys	Arg	His	Cys	Lys	Ala	
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Ala Glu Gln Ile Lys Glu Leu Lys Ala Leu Leu Asp Gln Glu Gly Asn
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Arg Arg His Ser Ser Leu Ile Asp Ile Asp Ser Val Pro Thr Tyr Lys
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Trp Lys Arg Gln Val Thr Gln Arg Asn Pro Val Gly Gln Lys Lys Arg
 130 135 140

Lys Met Ser Leu Leu Phe Asp His Leu Glu Pro Met Glu Leu Ala Glu
 145 150 155 160

His Leu Thr Tyr Leu Glu Tyr Arg Ser Phe Cys Lys Ile Leu Phe Gln
 165 170 175

Asp Tyr His Ser Phe Val Thr His Gly Cys Thr Val Asp Asn Pro Val
 180 185 190

Leu Glu Arg Phe Ile Ser Leu Phe Asn Ser Val Ser Gln Trp Val Gln
 195 200 205

Leu Met Ile Leu Ser Lys Pro Thr Ala Pro Gln Arg Ala Leu Val Ile
 210 215 220

Thr His Phe Val His Val Ala Glu Lys Leu Leu Gln Leu Gln Asn Phe
 225 230 235 240

Asn Thr Leu Met Ala Val Val Gly Gly Leu Ser His Ser Ser Ile Ser
 245 250 255

Arg Leu Lys Glu Thr His Ser His Val Ser Pro Glu Thr Ile Lys Leu
 260 265 270

Trp Glu Gly Leu Thr Glu Leu Val Thr Ala Thr Gly Asn Tyr Gly Asn
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Tyr Arg Arg Arg Leu Ala Ala Cys Val Gly Phe Arg Phe Pro Ile Leu
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Gly Val His Leu Lys Asp Leu Val Ala Leu Gln Leu Ala Leu Pro Asp
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Trp Leu Asp Pro Ala Arg Thr Arg Leu Asn Gly Ala Lys Met Lys Gln
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Leu Phe Ser Ile Leu Glu Glu Leu Ala Met Val Thr Ser Leu Arg Pro
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Pro Val Gln Ala Asn Pro Asp Leu Leu Ser Leu Leu Thr Val Ser Leu
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Asp Gln Tyr Gln Thr Glu Asp Glu Leu Tyr Gln Leu Ser Leu Gln Arg
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Glu Pro Arg Ser Lys Ser Ser Pro Thr Ser Pro Thr Ser Cys Thr Pro
 385 390 395 400

Pro Pro Arg Pro Pro Val Leu Glu Glu Trp Thr Ser Ala Ala Lys Pro
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Lys Leu Asp Gln Ala Leu Val Val Glu His Ile Glu Lys Met Val Glu
 420 425 430

Ser Val Phe Arg Asn Phe Asp Val Asp Gly Asp Gly His Ile Ser Gln
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Glu Glu Phe Gln Ile Ile Arg Gly Asn Phe Pro Tyr Leu Ser Ala Phe
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Gly Asp Leu Asp Gln Asn Gln Asp Gly Cys Ile Ser Arg Glu Glu Met
 465 470 475 480

Val Ser Tyr Phe Leu Arg Ser Ser Ser Val Leu Gly Gly Arg Met Gly
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Phe Val His Asn Phe Gln Glu Ser Asn Ser Leu Arg Pro Val Ala Cys
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Arg His Cys Lys Ala Leu Ile Leu Gly Ile Tyr Lys Gln Gly Leu Lys
 515 520 525

Cys Arg Ala Cys Gly Val Asn Cys His Lys Gln Cys Lys Asp Arg Leu

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535

540

Ser Val Glu Cys Arg Arg Arg Ala Gln Ser Val Ser Leu Glu Gly Ser
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Leu

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ccaggggcgc agagagccgc ggcc atg gga acc ctg ggc aag gcg aga gag 171
Met Gly Thr Leu Gly Lys Ala Arg Glu
1 5
gct ccg cgg aaa cct tgc cat ggc tcc aga gct ggc ccc aaa gga aga 219
Ala Pro Arg Lys Pro Cys His Gly Ser Arg Ala Gly Pro Lys Gly Arg
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cta gag gcc aaa tca acc aac agt cct ctc cct gcc cag ccc agc ttg 267
Leu Glu Ala Lys Ser Thr Asn Ser Pro Leu Pro Ala Gln Pro Ser Leu
30 35 40
gcc cag atc acc cag ttc cga atg atg gtg tcc ctg gga cat ctg gcc 315
Ala Gln Ile Thr Gln Phe Arg Met Met Val Ser Leu Gly His Leu Ala
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aaa gga gcc agc ctg gat gat ctt att gac agc tgc att caa tct ttc 363
Lys Gly Ala Ser Leu Asp Asp Leu Ile Asp Ser Cys Ile Gln Ser Phe
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Gln Asn Gly Glu Val Val Asp His Ser Glu Glu Ser Lys Asp Arg Thr	
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Met	Met	Val	Ser	Leu	Gly	His	Leu	Ala	Lys	Gly	Ala	Ser	Leu	Asp	Asp
	50					55				60					
Leu	Ile	Asp	Ser	Cys	Ile	Gln	Ser	Phe	Asp	Ala	Asp	Gly	Asn	Leu	Cys
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Lys	Lys	Arg	Lys	Val	Ser	Leu	Leu	Phe	Asp	His	Leu	Glu	Pro	Glu	Glu
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Glu Val Phe Ile Lys Phe Ile His Val Ala Gln Lys Leu His Gln Leu
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Gln Asn Phe Asn Thr Leu Met Ala Val Ile Gly Gly Leu Cys His Ser
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Ser Ile Ser Arg Leu Lys Glu Thr Ser Ser His Val Pro His Glu Ile
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Met Pro Asp Tyr Leu Glu Asp Gly Lys Val Asn Val Gln Lys Leu Leu
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Pro Pro Leu Asp Ala Asn Lys Asp Leu Val His Leu Leu Thr Leu Ser
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Pro Val Val Val Asp Trp Ala Ser Gly Val Ser Pro Lys Pro Asp Pro

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Lys Ile Ala Ala Ser Phe Pro Phe Ser Phe Cys Val Met Asp Lys Asp				
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Arg Glu Gly Leu Ile Ser Arg Asp Glu Ile Thr Ala Tyr Phe Met Arg				
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Ala Ser Ser Ile Tyr Ser Lys Leu Gly Leu Gly Phe Pro His Asn Phe				
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Gln Glu Thr Thr Tyr Leu Lys Pro Thr Phe Cys Asp Asn Cys Ala Gly				
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Phe Leu Trp Gly Val Ile Lys Gln Gly Tyr Arg Cys Lys Asp Cys Gly				
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Met Asn Cys His Lys Gln Cys Lys Asp Leu Val Val Phe Glu Cys Lys				
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Val Pro Met Ser Thr Leu Cys Pro Leu Gly Thr Lys Asp Leu Leu His				
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Ala Pro Glu Glu Gly Ser Phe Ile Phe Gln Asn Gly Glu Val Val Asp				
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His Ser Glu Glu Ser Lys Asp Arg Thr Ile Met Leu Leu Gly Val Ser				
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Ser Gln Lys Ile Ser Val Arg Leu Lys Arg Thr Val Ala His Lys Thr				
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Thr Gln Thr Glu Ser Phe Pro Trp Val Gly Gly Glu Met Pro Pro Gly				
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690 695 700

Val His Ser Pro Ala Ser Pro Cys Pro Ser Pro Ala Leu Val Arg Lys
705 710 715 720

Arg Ala Phe Val Lys Trp Glu Asn Lys Glu Ser Leu Ile Lys Pro Lys
725 730 735

Pro Glu Leu His Leu Arg Leu Arg Thr Tyr Gln Glu Leu Glu Gln Glu
740 745 750

Val Asn Thr Leu Arg Ala Asp Asn Asp Ala Leu Lys Ile Gln Leu Lys
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Met Gly Thr Leu
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Gly Lys Ala Arg Glu Ala Pro Arg Lys Pro Ser His Gly Cys Arg Ala
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gcc tct aaa gca aga cta gag gca aag cca gcc aac agc ccc ttc ccc 211
Ala Ser Lys Ala Arg Leu Glu Ala Lys Pro Ala Asn Ser Pro Phe Pro
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tcc cat ccc agc ttg gcc cac atc acc cag ttc cga atg atg gtg tct 259
Ser His Pro Ser Leu Ala His Ile Thr Gln Phe Arg Met Met Val Ser

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Thr Leu Met Ala Val Ile Gly Gly Leu Cys His Ser Ser Ile Ser Arg	
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ctc aag gag aca agt tcg cat gtc cca cat gaa atc aat aag gtt ctc	1075
Leu Lys Glu Thr Ser Ser His Val Pro His Glu Ile Asn Lys Val Leu	
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Gly Glu Met Thr Glu Leu Leu Ser Ser Ser Arg Asn Tyr Asp Asn Tyr	
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Arg Arg Ala Tyr Gly Glu Cys Thr Asp Phe Lys Ile Pro Ile Leu Gly	
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Val His Leu Lys Asp Leu Ile Ser Leu Tyr Glu Ala Met Pro Asp Tyr	
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ctg ggg gac ggg aaa gtg aac gtc cat aag cta ctg gcc cta tac aat	1267
Leu Gly Asp Gly Lys Val Asn Val His Lys Leu Leu Ala Leu Tyr Asn	
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Ala Asn Lys Asp Leu Val His Leu Leu Thr Leu Ser Leu Asp Leu Tyr	
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Tyr Thr Glu Asp Glu Ile Tyr Glu Leu Ser Tyr Ala Arg Glu Pro Arg	
425 430 435	
aac cac aga gct cca cca cta aca cct tca aag cca cca gta gta gtg	1459
Asn His Arg Ala Pro Pro Leu Thr Pro Ser Lys Pro Pro Val Val Val	
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Asp Trp Ala Ser Gly Val Ser Pro Lys Pro Asp Pro Lys Thr Ile Ser	
455 460 465	
aaa cac gtc cag agg atg gtg gat tct gtc ttc aag aac tat gat cac	1555
Lys His Val Gln Arg Met Val Asp Ser Val Phe Lys Asn Tyr Asp His	
470 475 480	
gac cag gat gga tac att tct cag gaa gaa ttt gaa aag att gct gcg	1603
Asp Gln Asp Gly Tyr Ile Ser Gln Glu Glu Phe Glu Lys Ile Ala Ala	
485 490 495 500	

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atc agc agg gat gag atc aca gcc tac ttc atg aga gcc agc tca atc Ile Ser Arg Asp Glu Ile Thr Ala Tyr Phe Met Arg Ala Ser Ser Ile 520 525 530	1699
tat tcc aag ctg ggc ctg ggc ttt cct cac aac ttc caa gag acc acc Tyr Ser Lys Leu Gly Leu Gly Phe Pro His Asn Phe Gln Glu Thr Thr 535 540 545	1747
tac ctg aag ccc act ttt tgt gac aac tgt gct gga ttt ctc tgg gga Tyr Leu Lys Pro Thr Phe Cys Asp Asn Cys Ala Gly Phe Leu Trp Gly 550 555 560	1795
gtg atc aaa caa gga tat cga tgt aaa gac tgc ggg atg aac tgt cac Val Ile Lys Gln Gly Tyr Arg Cys Lys Asp Cys Gly Met Asn Cys His 565 570 575 580	1843
aaa caa tgc aaa gat ctg gtt gtg ttt gag tgt aag aag cga gcc aag Lys Gln Cys Lys Asp Leu Val Val Phe Glu Cys Lys Lys Arg Ala Lys 585 590 595	1891
aac cca gta gct ccc aca gag aac aac act tct gtg ggg cca gtg tcc Asn Pro Val Ala Pro Thr Glu Asn Asn Thr Ser Val Gly Pro Val Ser 600 605 610	1939
aac ctt tgc tca ttg gga gcc aaa gat ctg ctc cat gca cct gag gaa Asn Leu Cys Ser Leu Gly Ala Lys Asp Leu Leu His Ala Pro Glu Glu 615 620 625	1987
gga cct ttt aca ttc cct aat ggg gag gct gtg gaa cat ggt gag gag Gly Pro Phe Thr Phe Pro Asn Gly Glu Ala Val Glu His Gly Glu Glu 630 635 640	2035
agt aag gat cgg acc atc atg ctg atg gga gtg tcc tca cag aag att Ser Lys Asp Arg Thr Ile Met Leu Met Gly Val Ser Ser Gln Lys Ile 645 650 655 660	2083
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tca cag cct tgg att ggc agt gag ggc cct tca ggt ccc ttt gtg ctg Ser Gln Pro Trp Ile Gly Ser Glu Gly Pro Ser Gly Pro Phe Val Leu 680 685 690	2179
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ccc acc tct cca tgt cct agc cca gtc ttg gtc aga aag cgg gct ttt Pro Thr Ser Pro Cys Pro Ser Pro Val Leu Val Arg Lys Arg Ala Phe 710 715 720	2275
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Met Met Val Ser Leu Gly His Leu Ala Lys Gly Ala Ser Leu Asp Asp	50	55	60
Leu Ile Asp Ser Cys Ile Gln Ser Phe Asp Ala Asp Gly Asn Leu Cys	65	70	75
Arg Ser Asn Gln Leu Leu Gln Val Met Leu Thr Met His Arg Ile Val	85	90	95
Ile Ser Ser Ala Glu Leu Leu Gln Lys Val Ile Thr Leu Tyr Lys Asp	100	105	110
Ala Leu Ala Lys Asn Ser Pro Gly Leu Cys Leu Lys Ile Cys Tyr Phe	115	120	125
Val Arg Tyr Trp Ile Thr Glu Phe Trp Val Met Phe Lys Met Asp Ala	130	135	140
Ser Leu Thr Asp Thr Met Glu Glu Phe Gln Glu Leu Val Lys Ala Lys	145	150	155
Gly Glu Glu Leu His Cys Arg Leu Ile Asp Thr Thr Gln Ile Asn Ala	165	170	175
Arg Asp Trp Ser Arg Lys Leu Thr Gln Arg Ile Lys Ser Asn Thr Ser	180	185	190
Lys Lys Arg Lys Val Ser Leu Leu Phe Asp His Leu Glu Pro Glu Glu	195	200	205
Leu Ser Glu His Leu Thr Tyr Leu Glu Phe Lys Ser Phe Arg Arg Ile	210	215	220
Ser Phe Ser Asp Tyr Gln Asn Tyr Leu Val Asn Ser Cys Val Lys Glu	225	230	235
			240

Asn Pro Thr Met Glu Arg Ser Ile Ala Leu Cys Asn Gly Ile Ser Gln
245 250 255

Trp Val Gln Leu Met Val Leu Ser Arg Pro Thr Pro Gln Leu Arg Ala
260 265 270

Glu Val Phe Ile Lys Phe Ile Gln Val Ala Gln Lys Leu His Gln Leu
275 280 285

Gln Asn Phe Asn Thr Leu Met Ala Val Ile Gly Gly Leu Cys His Ser
290 295 300

Ser Ile Ser Arg Leu Lys Glu Thr Ser Ser His Val Pro His Glu Ile
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Asn Lys Val Leu Gly Glu Met Thr Glu Leu Leu Ser Ser Ser Arg Asn
325 330 335

Tyr Asp Asn Tyr Arg Arg Ala Tyr Gly Glu Cys Thr Asp Phe Lys Ile
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Pro Ile Leu Gly Val His Leu Lys Asp Leu Ile Ser Leu Tyr Glu Ala
355 360 365

Met Pro Asp Tyr Leu Gly Asp Gly Lys Val Asn Val His Lys Leu Leu
370 375 380

Ala Leu Tyr Asn His Ile Ser Glu Leu Val Gln Leu Gln Glu Val Ala
385 390 395 400

Pro Pro Leu Glu Ala Asn Lys Asp Leu Val His Leu Leu Thr Leu Ser
405 410 415

Leu Asp Leu Tyr Tyr Thr Glu Asp Glu Ile Tyr Glu Leu Ser Tyr Ala
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Arg Glu Pro Arg Asn His Arg Ala Pro Pro Leu Thr Pro Ser Lys Pro
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Pro Val Val Val Asp Trp Ala Ser Gly Val Ser Pro Lys Pro Asp Pro
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Lys Thr Ile Ser Lys His Val Gln Arg Met Val Asp Ser Val Phe Lys
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Asn Tyr Asp His Asp Gln Asp Gly Tyr Ile Ser Gln Glu Glu Phe Glu
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Lys Ile Ala Ala Ser Phe Pro Phe Ser Phe Cys Val Met Asp Lys Asp
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Arg Glu Gly Leu Ile Ser Arg Asp Glu Ile Thr Ala Tyr Phe Met Arg
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Ala Ser Ser Ile Tyr Ser Lys Leu Gly Leu Gly Phe Pro His Asn Phe
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Gln Glu Thr Thr Tyr Leu Lys Pro Thr Phe Cys Asp Asn Cys Ala Gly
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Phe Leu Trp Gly Val Ile Lys Gln Gly Tyr Arg Cys Lys Asp Cys Gly
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Met Asn Cys His Lys Gln Cys Lys Asp Leu Val Val Phe Glu Cys Lys
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Lys Arg Ala Lys Asn Pro Val Ala Pro Thr Glu Asn Asn Thr Ser Val
 595 600 605

Gly Pro Val Ser Asn Leu Cys Ser Leu Gly Ala Lys Asp Leu Leu His
 610 615 620

Ala Pro Glu Glu Gly Pro Phe Thr Phe Pro Asn Gly Glu Ala Val Glu
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His Gly Glu Glu Ser Lys Asp Arg Thr Ile Met Leu Met Gly Val Ser
 645 650 655

Ser Gln Lys Ile Ser Leu Arg Leu Lys Arg Ala Val Ala His Lys Ala
 660 665 670

Thr Gln Thr Glu Ser Gln Pro Trp Ile Gly Ser Glu Gly Pro Ser Gly
 675 680 685

Pro Phe Val Leu Ser Ser Pro Arg Lys Thr Ala Gln Asp Thr Leu Tyr
690 695 700

Val Leu Pro Ser Pro Thr Ser Pro Cys Pro Ser Pro Val Leu Val Arg
705 710 715 720

Lys Arg Ala Phe Val Lys Trp Glu Asn Lys Asp Ser Leu Ile Lys Ser
725 730 735

Lys Glu Glu Leu Arg His Leu Arg Leu Pro Thr Tyr Gln Glu Leu Glu
740 745 750

Gln Glu Ile Asn Thr Leu Lys Ala Asp Asn Asp Ala Leu Lys Ile Gln
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Met Val Leu Lys Arg Met His Arg Pro Arg Cys Cys
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tct tac cag cta gtg ttc gag cac cgg cgc cca agc tgc atc cag gga 280
Ser Tyr Gln Leu Val Phe Glu His Arg Arg Pro Ser Cys Ile Gln Gly
15 20 25
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Leu Arg Trp Thr Pro Leu Thr Asn Ser Glu Gly Ser Leu Asp Phe Arg
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aga aaa tac cat ctg cga cta cat cgg cag tgc tgc tct ggc cgg gag Arg Lys Tyr His Leu Arg Leu His Arg Gln Cys Cys Ser Gly Arg Glu 80 85 90	472
cta gtg gat ggg atc ttg gct ctg ggt ctt ggg gtc cac tca cgg agc Leu Val Asp Gly Ile Leu Ala Leu Gly Leu Gly Val His Ser Arg Ser 95 100 105	520
caa gct gtg ggc atc tgc cag gtg ttg ctg gat gag ggt gcc ctt tgc Gln Ala Val Gly Ile Cys Gln Val Leu Leu Asp Glu Gly Ala Leu Cys 110 115 120	568
cat gta aaa cat gac tgg acc ttc cag gac cga gac gcc caa ttc tac His Val Lys His Asp Trp Thr Phe Gln Asp Arg Asp Ala Gln Phe Tyr 125 130 135 140	616
aga ttc cct gga ccg gag ccc cag cct gca gga act cat gac gtg gaa Arg Phe Pro Gly Pro Glu Pro Gln Pro Ala Gly Thr His Asp Val Glu 145 150 155	664
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ctt	cga	gaa	aat	aac	tgt	cac	ttt	ctg	cgt	gtg	gac	aag	cag	gac	ttc	1096	
Leu	Arg	Glu	Asn	Asn	Cys	His	Phe	Leu	Arg	Val	Asp	Lys	Gln	Asp	Phe		
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aac	cgc	atc	atc	aag	gat	gtg	gaa	gca	aaa	acc	atg	aga	ctg	gaa	gaa	1144	
Asn	Arg	Ile	Ile	Lys	Asp	Val	Glu	Ala	Lys	Thr	Met	Arg	Leu	Glu	Glu		
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cac	ggc	aaa	gtg	gtg	tta	gtt	ttg	gag	aga	acc	tct	cag	ggg	gct	ggc	1192	
His	Gly	Lys	Val	Val	Leu	Val	Leu	Glu	Arg	Thr	Ser	Gln	Gly	Ala	Gly		
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cct	tcc	cgc	cct	ccg	acc	cca	ggc	agg	aac	cga	tat	acg	gta	atg	tct	1240	
Pro	Ser	Arg	Pro	Pro	Thr	Pro	Gly	Arg	Asn	Arg	Tyr	Thr	Val	Met	Ser		
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Asp	Ser	Ser	Ala	His	Asp	Pro	Thr	Glu	Thr	Phe	Leu	Ser	Asp	Phe	Leu		
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ctg	acg	cac	agt	gtc	ttc	atg	ccc	tgc	aca	cag	ctc	ttt	gcc	gcc	ctc	1384	
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Gln	Glu	Arg	Ser	Thr	Tyr	Ile	Cys	Asn	Lys	Arg	Gln	Gln	Ile	Leu	Arg		
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Pro	Val	Ala	Thr	Ser	Phe	Leu	Gln	Lys	Leu	Ser	Asp	Leu	Val	Ser	Arg		
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Asp	Thr	Arg	Leu	Ser	Asn	Leu	Leu	Arg	Glu	Gln	Tyr	Pro	Glu	Arg	Arg		
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cga	cac	cac	agg	ttg	gag	aat	ggc	tgt	ggg	aat	gta	tct	cct	cag	acc	1672	
Arg	His	His	Arg	Leu	Glu	Asn	Gly	Cys	Gly	Asn	Val	Ser	Pro	Gln	Thr		
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aag	gcc	cgg	aat	gca	cct	gtt	tgg	ttt	cct	aac	cat	gag	gaa	ccc	ctc	1720	
Lys	Ala	Arg	Asn	Ala	Pro	Val	Trp	Phe	Pro	Asn	His	Glu	Glu	Pro	Leu		

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gaa agg ttg ctg gac cct tcc tgg aac cac cga gtg tac cga ttg gct	2488
Glu Arg Leu Leu Asp Pro Ser Trp Asn His Arg Val Tyr Arg Leu Ala	
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Leu Thr Lys Leu Ser Pro Pro Val Ile Pro Phe Met Pro Leu Leu Leu	
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Lys Asp Met Thr Phe Ile His Glu Gly Asn His Thr Leu Val Glu Asn	
785 790 795	
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Ser Arg Val Ser His Ile His Glu Asp Ser Gln Ala Ser Arg Ile Ser	
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Thr Cys Ser Glu Gln Ser Leu Ser Thr Arg Ser Pro Ala Ser Thr Trp	
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Ala Tyr Val Gln Gln Leu Lys Val Ile Asp Asn Gln Arg Glu Leu Ser	
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3373

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Gln Ala Thr Thr Glu His Val His Lys Ala Gly Lys Leu Leu Tyr Arg
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His Leu Leu Ala Thr Tyr Pro Thr Leu Ile Arg Asp Arg Lys Tyr His
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Leu Arg Leu His Arg Gln Cys Cys Ser Gly Arg Glu Leu Val Asp Gly
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Ile Leu Ala Leu Gly Leu Gly Val His Ser Arg Ser Gln Ala Val Gly
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Pro Glu Pro Gln Pro Ala Gly Thr His Asp Val Glu Glu Glu Leu Val
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Lys Asp Val Glu Ala Lys Thr Met Arg Leu Glu Glu His Gly Lys Val
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Glu Gly Asn His Thr Leu Val Glu Asn Leu Ile Asn Phe Glu Lys Met
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Arg Met Met Ala Arg Ala Ala Arg Met Leu His His Cys Arg Ser His
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His Thr Asp Pro Val Ala Thr Ser Phe Leu Gln Lys Leu Ser Asp Leu	
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gtg ggc agg gac acc cga ctc agc aac ctg ctg agg gag cag tgg cca	1625
Val Gly Arg Asp Thr Arg Leu Ser Asn Leu Leu Arg Glu Gln Trp Pro	
455 460 465 470	
gag agg cgg cga tgc cac agg ttg gag aat ggc tgt ggg aat gca tct	1673
Glu Arg Arg Arg Cys His Arg Leu Glu Asn Gly Cys Gly Asn Ala Ser	
475 480 485	
cct cag atg aag gtg tct gcc tgg ccc cag ttt ctt tcc tct gct cct	1721
Pro Gln Met Lys Val Ser Ala Trp Pro Gln Phe Leu Ser Ser Ala Pro	
490 495 500	
cct gga ctg cag gca cct cct tcg ccc cct gac cct gag ggg ctc tgt	1769
Pro Gly Leu Gln Ala Pro Pro Ser Pro Pro Asp Pro Glu Gly Leu Cys	
505 510 515	
ggg cgt ggg aag ctc tcc tcc cac aga cac acc ctt ggg tct ctg ata	1817
Gly Arg Gly Lys Leu Ser Ser His Arg His Thr Leu Gly Ser Leu Ile	
520 525 530	
ggt gtt cac ggg gcc ctt gct gca tgt ggt gcc ctg ggc cag gcc gtg	1865
Gly Val His Gly Ala Leu Ala Ala Cys Gly Ala Leu Gly Gln Ala Val	
535 540 545 550	
cca gga ggc gca gag gcc taaggtggcc tccctcctcg ccactccct	1913
Pro Gly Gly Ala Glu Ala	
555	
gactcaatgg gcctttttatt ccttttggga ggtaattcat gcccacaggt agagcctggg	1973
agatgaggaa tgggtggctgg agttggcccc tgaggccac ggggctcctg gtggccagtg	2033
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<210> 14
 <211> 556
 <212> PRT
 <213> Homo sapiens

<400> 14

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Leu Leu Glu His Gln His Pro Ser Cys Ile Gln Gly Leu Arg Trp Thr	20	25	30
Pro Leu Thr Asn Ser Glu Glu Ser Leu Asp Phe Ser Glu Ser Leu Glu	35	40	45
Gln Ala Ser Thr Glu Arg Val Leu Arg Ala Gly Arg Gln Leu His Gln	50	55	60
His Leu Leu Ala Thr Cys Pro Asn Leu Ile Arg Asp Arg Lys Tyr His	65	70	75
Leu Arg Leu Tyr Arg Gln Cys Cys Ser Gly Arg Glu Leu Val Asp Gly	85	90	95
Ile Leu Ala Leu Gly Leu Gly Val His Ser Arg Ser Gln Val Val Gly	100	105	110
Ile Cys Gln Val Leu Leu Asp Glu Gly Ala Leu Cys His Val Lys His	115	120	125
Asp Trp Ala Phe Gln Asp Arg Asp Ala Gln Phe Tyr Arg Phe Pro Gly	130	135	140
Pro Glu Pro Glu Pro Val Gly Thr His Glu Met Glu Glu Glu Leu Ala	145	150	155
Glu Ala Val Ala Leu Leu Ser Gln Arg Gly Pro Asp Ala Leu Leu Thr	165	170	175
Val Ala Leu Arg Lys Pro Pro Gly Gln Arg Thr Asp Glu Glu Leu Asp	180	185	190
Leu Ile Phe Glu Glu Leu Leu His Ile Lys Ala Val Ala His Leu Ser	195	200	205
Asn Ser Val Lys Arg Glu Leu Ala Ala Val Leu Leu Phe Glu Pro His	210	215	220
Ser Lys Ala Gly Thr Val Leu Phe Ser Gln Gly Asp Lys Gly Thr Ser	225	230	235
			240

Trp Tyr Ile Ile Trp Lys Gly Ser Val Asn Val Val Thr His Gly Lys
245 250 255

Gly Leu Val Thr Thr Leu His Glu Gly Asp Asp Phe Gly Gln Leu Ala
260 265 270

Leu Val Asn Asp Ala Pro Arg Ala Ala Thr Ile Ile Leu Arg Glu Tyr
275 280 285

Asn Cys His Phe Leu Arg Val Asp Lys Gln Asp Phe Asn Arg Ile Ile
290 295 300

Lys Asp Val Glu Ala Lys Thr Met Arg Leu Glu Glu His Gly Lys Val
305 310 315 320

Val Leu Val Leu Glu Arg Ala Ser Gln Gly Ala Gly Pro Ser Arg Pro
325 330 335

Pro Thr Pro Gly Arg Asn Arg Tyr Thr Val Met Ser Gly Thr Pro Asp
340 345 350

Lys Ile Leu Glu Leu Leu Leu Glu Ala Met Gly Leu Asp Ser Ser Ala
355 360 365

His Asp Pro Lys Glu Thr Phe Leu Ser Asp Phe Leu Leu Thr His Arg
370 375 380

Val Phe Met Pro Ser Ala Gln Leu Cys Ala Ala Leu Leu His His Phe
385 390 395 400

His Val Glu Pro Ala Gly Gly Ser Glu Gln Glu Arg Ser Thr Tyr Val
405 410 415

Cys Asn Lys Arg Gln Gln Ile Leu Arg Leu Val Ser Gln Trp Val Ala
420 425 430

Leu Tyr Gly Ser Met Leu His Thr Asp Pro Val Ala Thr Ser Phe Leu
435 440 445

Gln Lys Leu Ser Asp Leu Val Gly Arg Asp Thr Arg Leu Ser Asn Leu
450 455 460

Leu Arg Glu Gln Trp Pro Glu Arg Arg Arg Cys His Arg Leu Glu Asn
 465 470 475 480

Gly Cys Gly Asn Ala Ser Pro Gln Met Lys Val Ser Ala Trp Pro Gln
 485 490 495

Phe Leu Ser Ser Ala Pro Pro Gly Leu Gln Ala Pro Pro Ser Pro Pro
 500 505 510

Asp Pro Glu Gly Leu Cys Gly Arg Gly Lys Leu Ser Ser His Arg His
 515 520 525

Thr Leu Gly Ser Leu Ile Gly Val His Gly Ala Leu Ala Ala Cys Gly
 530 535 540

Ala Leu Gly Gln Ala Val Pro Gly Gly Ala Glu Ala
 545 550 555

<210> 15
 <211> 1966
 <212> DNA
 <213> Rattus norvegicus

<220>
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 <222> (3)..(875)

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 Gly Val Leu Lys Pro Asn Asp Val Ser Val Phe Thr Thr Leu Thr
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 att aat gga cgc ctg ttt gcc tgc ccg cga gag caa ttc gac tca ctg 95
 Ile Asn Gly Arg Leu Phe Ala Cys Pro Arg Glu Gln Phe Asp Ser Leu
 20 25 30
 act ccc ttg cca gaa cag gag ggc ccg acc act ggg aca gtg ggg acg 143
 Thr Pro Leu Pro Glu Gln Glu Gly Pro Thr Thr Gly Thr Val Gly Thr
 35 40 45
 ttt gaa ctg atg agc tcg aaa gac ttg gcg tac cag atg aca acg tat 191
 Phe Glu Leu Met Ser Ser Lys Asp Leu Ala Tyr Gln Met Thr Thr Tyr
 50 55 60
 gac tgg gaa ctc ttc aac tgt gtg ctc gag ctg gag cta atc tac cac 239
 Asp Trp Glu Leu Phe Asn Cys Val Leu Glu Leu Glu Leu Ile Tyr His
 65 70 75
 aca ttt gga agg cat aat ttt aaa aag acc aca gca aac ttg gat ttg 287

[illegible]

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ccacacagga gaaggatctg tcttgtctaa cggggacatg ccgtagctta ggaaccatca 1095
gctgtagtca tcttcttcac ggttggcaca ccaccgcagg ctcacgtgaa ggcataacct 1155
ggcgaggcta caccaggccc ctgacatccc ttcccaggct gttgcagcat gagactgtcc 1215
cgtggatagg tttgacttgg aatcgctgca atgatataat tgaatgattt gtttacttag 1275
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tcatgttcct ccacgtcat aatcttacct ctgaaggaat ggaacctcat cacaacacta 1395
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ttatttattt tattcagtat gaaattttgg agtacatttt ttctgttttc ttaattagac 1875
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<210> 16
<211> 291
<212> PRT
<213> Rattus norvegicus

<400> 16

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Asn Gly Arg Leu Phe Ala Cys Pro Arg Glu Gln Phe Asp Ser Leu Thr
20 25 30

Pro Leu Pro Glu Gln Glu Gly Pro Thr Thr Gly Thr Val Gly Thr Phe
35 40 45

Glu Leu Met Ser Ser Lys Asp Leu Ala Tyr Gln Met Thr Thr Tyr Asp
50 55 60

Trp Glu Leu Phe Asn Cys Val Leu Glu Leu Glu Leu Ile Tyr His Thr
65 70 75 80

Phe Gly Arg His Asn Phe Lys Lys Thr Thr Ala Asn Leu Asp Leu Phe
85 90 95

Leu Arg Arg Phe Asn Glu Ile Gln Phe Trp Val Val Thr Glu Ile Cys
100 105 110

Leu Cys Ser Gln Leu Ser Lys Arg Val Gln Leu Leu Lys Lys Cys Ile
115 120 125

Lys Ile Ala Ala His Cys Lys Glu Tyr Lys Asn Leu Asn Ser Phe Phe
130 135 140

Gly Ile Val Met Gly Leu Ser Asn Val Ala Glu Ser Arg Leu Ala Leu
145 150 155 160

Thr Trp Glu Lys Leu Pro Ser Lys Phe Lys Lys Phe Tyr Ala Glu Phe
165 170 175

Glu Ser Leu Met Asp Pro Ser Arg Asn His Lys Ala Tyr Arg Leu Thr
180 185 190

Ala Ala Lys Leu Glu Pro Pro Leu Ile Pro Phe Met Pro Leu Leu Ile
195 200 205

Lys Asp Met Thr Phe Thr His Glu Gly Asn Lys Thr Phe Ile Asp Asn
210 215 220

Leu Val Asn Phe Glu Lys Met Arg Met Ile Ala Asn Thr Ala Arg Thr
225 230 235 240

Val Arg Tyr Tyr Arg Ser Gln Pro Phe Asn Pro Asp Ala Ala Gln Ala
245 250 255

Asn Lys Asn His Gln Asp Val Arg Ser Tyr Val Arg Gln Leu Asn Val
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Ile Asp Asn Gln Arg Thr Leu Ser Gln Met Ser His Arg Leu Glu Pro
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Arg Arg Pro
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<210> 17
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<212> DNA
<213> Homo sapiens

<220>
<221> CDS
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agggaataac attatttcgc caggggtgata tggaacaaac tggatatgctg cctggcaggg 180
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ctgggaattg ggacggcctt tggagagtcc attctggaca acacaccccg ccatgcaacc 300
atcgttacca gggagagcag tgaactgctc cgcacgcagc agaaggactt caaggcacta 360
tgggagaaat atcgacagta tatggcagga cttctggctc ctcctt atg gta tta 415
Met Val Leu
1
tgg aaa cgg gct cta aca atg aca gga ttc ctg aca agg aga aca cac 463
Trp Lys Arg Ala Leu Thr Met Thr Gly Phe Leu Thr Arg Arg Thr His
5 10 15
ctc att gaa cct cac gtt cct ctt cgt cct gct aac acc att acc aag 511
Leu Ile Glu Pro His Val Pro Leu Arg Pro Ala Asn Thr Ile Thr Lys
20 25 30 35
gtc cct tca gag aag atc ctc aga gct gga aaa att tta cga aat gcc 559
Val Pro Ser Glu Lys Ile Leu Arg Ala Gly Lys Ile Leu Arg Asn Ala
40 45 50
att ctc tct cga gca cct cac atg ata aga gat aga aaa tac cac cta 607
Ile Leu Ser Arg Ala Pro His Met Ile Arg Asp Arg Lys Tyr His Leu
55 60 65
aag aca tac aga caa tgc tgt gtg gga act gaa ctg gtg gac tgg atg 655
Lys Thr Tyr Arg Gln Cys Cys Val Gly Thr Glu Leu Val Asp Trp Met
70 75 80
atc gac gag aca cca tgt gtt cac tcc cgg act caa gct gtt ggc atg 703
Ile Asp Glu Thr Pro Cys Val His Ser Arg Thr Gln Ala Val Gly Met
85 90 95
tgg caa gtc ctg tta gaa gat ggt gtt ctc aac cac gtg gac cag gag 751
Trp Gln Val Leu Leu Glu Asp Gly Val Leu Asn His Val Asp Gln Glu

100	105	110	115	
cac cat ttc caa gac ttt tat tta ttc tat cga ttt ctg gat gat gag				799
His His Phe Gln Asp Phe Tyr Leu Phe Tyr Arg Phe Leu Asp Asp Glu	120	125	130	
cac gag gat gcc cct ttg cct act gag gag gag aag aag gag tgt gat				847
His Glu Asp Ala Pro Leu Pro Thr Glu Glu Glu Lys Lys Glu Cys Asp	135	140	145	
gag gag ctc cag gac acc atg ctg ctg ctg tca cag atg ggc ccc gac				895
Glu Glu Leu Gln Asp Thr Met Leu Leu Leu Ser Gln Met Gly Pro Asp	150	155	160	
gcc cac atg agg atg atc ctt cgc aaa cca cct ggc cag agg act gtg				943
Ala His Met Arg Met Ile Leu Arg Lys Pro Pro Gly Gln Arg Thr Val	165	170	175	
gat gac cta gag att atc tat gag gag ctt ctt cat att aaa gcc tta				991
Asp Asp Leu Glu Ile Ile Tyr Glu Glu Leu Leu His Ile Lys Ala Leu	180	185	190	195
tcc cat ctt tct acc aca gtg aaa cga gag tta gca ggt gtt ctc att				1039
Ser His Leu Ser Thr Thr Val Lys Arg Glu Leu Ala Gly Val Leu Ile	200	205	210	
ttt gag tct cac gcc aaa gga ggg act gtg ttg ttt aac cag ggg gaa				1087
Phe Glu Ser His Ala Lys Gly Gly Thr Val Leu Phe Asn Gln Gly Glu	215	220	225	
gaa ggt acc tcc tgg tac att att cta aaa gga tca gtg aat gta gtc				1135
Glu Gly Thr Ser Trp Tyr Ile Ile Leu Lys Gly Ser Val Asn Val Val	230	235	240	
att tac ggc aag ggt gtg gtc tgc acc ctg cat gaa gga gat gac ttc				1183
Ile Tyr Gly Lys Gly Val Val Cys Thr Leu His Glu Gly Asp Asp Phe	245	250	255	
ggc aag tta gca cta gtg aat gat gcc cca cga gct gcc tct atc gtc				1231
Gly Lys Leu Ala Leu Val Asn Asp Ala Pro Arg Ala Ala Ser Ile Val	260	265	270	275
tta cga gaa gat aac tgc cat ttc tta aga gta gac aag gag gat ttc				1279
Leu Arg Glu Asp Asn Cys His Phe Leu Arg Val Asp Lys Glu Asp Phe	280	285	290	
aac cgg atc cta agg gac gtg gag gcg aat aca gtc aga ctt aaa gaa				1327
Asn Arg Ile Leu Arg Asp Val Glu Ala Asn Thr Val Arg Leu Lys Glu	295	300	305	
cat gac caa gat gtc ttg gtg ctg gag aag gtc cca gca ggg aac aga				1375
His Asp Gln Asp Val Leu Val Leu Glu Lys Val Pro Ala Gly Asn Arg	310	315	320	
gct tct aat caa gga aac tca cag cct cag caa aag tat act gtg atg				1423
Ala Ser Asn Gln Gly Asn Ser Gln Pro Gln Gln Lys Tyr Thr Val Met	325	330	335	

tca gga aca cct gaa aaa att tta gag cat ttt cta gaa aca ata cgc	1471
Ser Gly Thr Pro Glu Lys Ile Leu Glu His Phe Leu Glu Thr Ile Arg	
340 345 350 355	
ctt gag gca act tta aat gaa gca aca gat tct gtt tta aat gac ttt	1519
Leu Glu Ala Thr Leu Asn Glu Ala Thr Asp Ser Val Leu Asn Asp Phe	
360 365 370	
att atg atg cac tgt gtt ttt atg cca aat acc cag ctt tgc ccg gca	1567
Ile Met Met His Cys Val Phe Met Pro Asn Thr Gln Leu Cys Pro Ala	
375 380 385	
ctg gtg gcc cac tac cac gca cag cct tca caa ggt aca gaa cag gag	1615
Leu Val Ala His Tyr His Ala Gln Pro Ser Gln Gly Thr Glu Gln Glu	
390 395 400	
aaa atg gat tat gcc ctc aac aat aag agg cga gtc atc cgc ctg gtt	1663
Lys Met Asp Tyr Ala Leu Asn Asn Lys Arg Arg Val Ile Arg Leu Val	
405 410 415	
cta cag tgg gct gcc atg tat gga gac ctc ctg caa gag gat gac gta	1711
Leu Gln Trp Ala Ala Met Tyr Gly Asp Leu Leu Gln Glu Asp Asp Val	
420 425 430 435	
tct atg gcc ttc ctg gag gag ttt tat gta tct gta tca gat gat gcc	1759
Ser Met Ala Phe Leu Glu Glu Phe Tyr Val Ser Val Ser Asp Asp Ala	
440 445 450	
cgg atg att gct gcc ctc aag gag caa ctg cca gag ttg gag aag att	1807
Arg Met Ile Ala Ala Leu Lys Glu Gln Leu Pro Glu Leu Glu Lys Ile	
455 460 465	
gtc aag caa atc tca gaa gat gca aag gca cca caa aag aag cac aag	1855
Val Lys Gln Ile Ser Glu Asp Ala Lys Ala Pro Gln Lys Lys His Lys	
470 475 480	
gtt ctt ttg caa cag ttc aat acg ggc gat gag aga gcc cag aag cgc	1903
Val Leu Leu Gln Gln Phe Asn Thr Gly Asp Glu Arg Ala Gln Lys Arg	
485 490 495	
cag cct atc cgc ggc tct gat gaa gtt ctg ttt aag gtc tat tgc atg	1951
Gln Pro Ile Arg Gly Ser Asp Glu Val Leu Phe Lys Val Tyr Cys Met	
500 505 510 515	
gac cac acc tac aca acc att cgg gtg cca gtg gcc act tcg gtg aag	1999
Asp His Thr Tyr Thr Thr Ile Arg Val Pro Val Ala Thr Ser Val Lys	
520 525 530	
gaa gtc atc agt gca gtt gcc gac aag ctg ggc tcc ggg gag ggc ctg	2047
Glu Val Ile Ser Ala Val Ala Asp Lys Leu Gly Ser Gly Glu Gly Leu	
535 540 545	
atc ata gtc aag atg agt tcc gga gga gaa aag gtg gtg ctc aaa cct	2095
Ile Ile Val Lys Met Ser Ser Gly Gly Glu Lys Val Val Leu Lys Pro	
550 555 560	

aat gat gtt tca gta ttt acg acg ctc acc att aat gga cgc ctg ttt Asn Asp Val Ser Val Phe Thr Thr Leu Thr Ile Asn Gly Arg Leu Phe 565 570 575	2143
gct tgc ccg cga gag caa ttc gat tca ctg act ccc tta cca gaa cag Ala Cys Pro Arg Glu Gln Phe Asp Ser Leu Thr Pro Leu Pro Glu Gln 580 585 590 595	2191
gaa ggc cca act gtt gga aca gtg gga act ttt gaa ctg atg agc tcc Glu Gly Pro Thr Val Gly Thr Val Gly Thr Phe Glu Leu Met Ser Ser 600 605 610	2239
aaa gat tta gca tac cag atg aca att tat gat tgg gaa ctc ttc aac Lys Asp Leu Ala Tyr Gln Met Thr Ile Tyr Asp Trp Glu Leu Phe Asn 615 620 625	2287
tgc gtg cat gag ctg gag cta atc tat cac aca ttt gga agg cat aat Cys Val His Glu Leu Glu Leu Ile Tyr His Thr Phe Gly Arg His Asn 630 635 640	2335
ttt aaa aag acc aca gca aac ttg gat ttg ttc ctg agg aga ttt aat Phe Lys Lys Thr Thr Ala Asn Leu Asp Leu Phe Leu Arg Arg Phe Asn 645 650 655	2383
gaa att cag ttt tgg gtc gtc act gag atc tgc ctt tgt tct cag ctc Glu Ile Gln Phe Trp Val Val Thr Glu Ile Cys Leu Cys Ser Gln Leu 660 665 670 675	2431
agc aag cgt gtt cag cta tta aaa aaa ttt att aag ata gca gcc cac Ser Lys Arg Val Gln Leu Leu Lys Lys Phe Ile Lys Ile Ala Ala His 680 685 690	2479
tgt aag gag tat aaa aat ctg aat tcc ttt ttt gcc atc gtc atg gga Cys Lys Glu Tyr Lys Asn Leu Asn Ser Phe Phe Ala Ile Val Met Gly 695 700 705	2527
cta agt aac att gct gtg agc cgc ttg gca cta acg tgg gag aaa ctg Leu Ser Asn Ile Ala Val Ser Arg Leu Ala Leu Thr Trp Glu Lys Leu 710 715 720	2575
cca agc aag ttc aag aag ttc tat gcg gag ttt gaa agt tta atg gac Pro Ser Lys Phe Lys Lys Phe Tyr Ala Glu Phe Glu Ser Leu Met Asp 725 730 735	2623
cct tca agg aac cac agg gcc tac agg ctg aca gta gct aag ctg gaa Pro Ser Arg Asn His Arg Ala Tyr Arg Leu Thr Val Ala Lys Leu Glu 740 745 750 755	2671
cct cct ctc atc ccc ttc atg cct ttg ctc att aaa gat atg aca ttt Pro Pro Leu Ile Pro Phe Met Pro Leu Leu Ile Lys Asp Met Thr Phe 760 765 770	2719
act cat gag ggg aac aag acg ttc att gac aat cta gta aac ttt gaa Thr His Glu Gly Asn Lys Thr Phe Ile Asp Asn Leu Val Asn Phe Glu 775 780 785	2767
aaa atg cgc atg att gca aat acg gcc aga aca gtg aga tac tac agg	2815

Lys Met Arg Met Ile Ala Asn Thr Ala Arg Thr Val Arg Tyr Tyr Arg
 790 795 800

agc caa ccc ttc aat cct gat gca gct caa gct aat aag aac cat cag 2863
 Ser Gln Pro Phe Asn Pro Asp Ala Ala Gln Ala Asn Lys Asn His Gln
 805 810 815

gat gtc cgg agt tat gta cgg caa tta aat gtg att gac aac cag aga 2911
 Asp Val Arg Ser Tyr Val Arg Gln Leu Asn Val Ile Asp Asn Gln Arg
 820 825 830 835

act tta tca cag atg tca cac aga tta gag cct cgt cga cca 2953
 Thr Leu Ser Gln Met Ser His Arg Leu Glu Pro Arg Arg Pro
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tagacatttc aaatgcccaa agcaacagtt tgtctccagt ccacaatttt caaaaatgcc 3013

<210> 18
 <211> 849
 <212> PRT
 <213> Homo sapiens

<400> 18

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Arg Thr His Leu Ile Glu Pro His Val Pro Leu Arg Pro Ala Asn Thr
 20 25 30

Ile Thr Lys Val Pro Ser Glu Lys Ile Leu Arg Ala Gly Lys Ile Leu
 35 40 45

Arg Asn Ala Ile Leu Ser Arg Ala Pro His Met Ile Arg Asp Arg Lys
 50 55 60

Tyr His Leu Lys Thr Tyr Arg Gln Cys Cys Val Gly Thr Glu Leu Val
 65 70 75 80

Asp Trp Met Ile Asp Glu Thr Pro Cys Val His Ser Arg Thr Gln Ala
 85 90 95

Val Gly Met Trp Gln Val Leu Leu Glu Asp Gly Val Leu Asn His Val
 100 105 110

Asp Gln Glu His His Phe Gln Asp Phe Tyr Leu Phe Tyr Arg Phe Leu
 115 120 125

Asp Asp Glu His Glu Asp Ala Pro Leu Pro Thr Glu Glu Glu Lys Lys
 130 135 140

Glu Cys Asp Glu Glu Leu Gln Asp Thr Met Leu Leu Leu Ser Gln Met
 145 150 155 160

Gly Pro Asp Ala His Met Arg Met Ile Leu Arg Lys Pro Pro Gly Gln
 165 170 175

Arg Thr Val Asp Asp Leu Glu Ile Ile Tyr Glu Glu Leu Leu His Ile
 180 185 190

Lys Ala Leu Ser His Leu Ser Thr Thr Val Lys Arg Glu Leu Ala Gly
 195 200 205

Val Leu Ile Phe Glu Ser His Ala Lys Gly Gly Thr Val Leu Phe Asn
 210 215 220

Gln Gly Glu Glu Gly Thr Ser Trp Tyr Ile Ile Leu Lys Gly Ser Val
 225 230 235 240

Asn Val Val Ile Tyr Gly Lys Gly Val Val Cys Thr Leu His Glu Gly
 245 250 255

Asp Asp Phe Gly Lys Leu Ala Leu Val Asn Asp Ala Pro Arg Ala Ala
 260 265 270

Ser Ile Val Leu Arg Glu Asp Asn Cys His Phe Leu Arg Val Asp Lys
 275 280 285

Glu Asp Phe Asn Arg Ile Leu Arg Asp Val Glu Ala Asn Thr Val Arg
 290 295 300

Leu Lys Glu His Asp Gln Asp Val Leu Val Leu Glu Lys Val Pro Ala
 305 310 315 320

Gly Asn Arg Ala Ser Asn Gln Gly Asn Ser Gln Pro Gln Gln Lys Tyr
 325 330 335

Thr Val Met Ser Gly Thr Pro Glu Lys Ile Leu Glu His Phe Leu Glu
 340 345 350

Thr Ile Arg Leu Glu Ala Thr Leu Asn Glu Ala Thr Asp Ser Val Leu

355

360

365

Asn Asp Phe Ile Met Met His Cys Val Phe Met Pro Asn Thr Gln Leu
 370 375 380

Cys Pro Ala Leu Val Ala His Tyr His Ala Gln Pro Ser Gln Gly Thr
 385 390 395 400

Glu Gln Glu Lys Met Asp Tyr Ala Leu Asn Asn Lys Arg Arg Val Ile
 405 410 415

Arg Leu Val Leu Gln Trp Ala Ala Met Tyr Gly Asp Leu Leu Gln Glu
 420 425 430

Asp Asp Val Ser Met Ala Phe Leu Glu Glu Phe Tyr Val Ser Val Ser
 435 440 445

Asp Asp Ala Arg Met Ile Ala Ala Leu Lys Glu Gln Leu Pro Glu Leu
 450 455 460

Glu Lys Ile Val Lys Gln Ile Ser Glu Asp Ala Lys Ala Pro Gln Lys
 465 470 475 480

Lys His Lys Val Leu Leu Gln Gln Phe Asn Thr Gly Asp Glu Arg Ala
 485 490 495

Gln Lys Arg Gln Pro Ile Arg Gly Ser Asp Glu Val Leu Phe Lys Val
 500 505 510

Tyr Cys Met Asp His Thr Tyr Thr Thr Ile Arg Val Pro Val Ala Thr
 515 520 525

Ser Val Lys Glu Val Ile Ser Ala Val Ala Asp Lys Leu Gly Ser Gly
 530 535 540

Glu Gly Leu Ile Ile Val Lys Met Ser Ser Gly Gly Glu Lys Val Val
 545 550 555 560

Leu Lys Pro Asn Asp Val Ser Val Phe Thr Thr Leu Thr Ile Asn Gly
 565 570 575

Arg Leu Phe Ala Cys Pro Arg Glu Gln Phe Asp Ser Leu Thr Pro Leu
 580 585 590

Pro Glu Gln Glu Gly Pro Thr Val Gly Thr Val Gly Thr Phe Glu Leu
595 600 605

Met Ser Ser Lys Asp Leu Ala Tyr Gln Met Thr Ile Tyr Asp Trp Glu
610 615 620

Leu Phe Asn Cys Val His Glu Leu Glu Leu Ile Tyr His Thr Phe Gly
625 630 635 640

Arg His Asn Phe Lys Lys Thr Thr Ala Asn Leu Asp Leu Phe Leu Arg
645 650 655

Arg Phe Asn Glu Ile Gln Phe Trp Val Val Thr Glu Ile Cys Leu Cys
660 665 670

Ser Gln Leu Ser Lys Arg Val Gln Leu Leu Lys Lys Phe Ile Lys Ile
675 680 685

Ala Ala His Cys Lys Glu Tyr Lys Asn Leu Asn Ser Phe Phe Ala Ile
690 695 700

Val Met Gly Leu Ser Asn Ile Ala Val Ser Arg Leu Ala Leu Thr Trp
705 710 715 720

Glu Lys Leu Pro Ser Lys Phe Lys Lys Phe Tyr Ala Glu Phe Glu Ser
725 730 735

Leu Met Asp Pro Ser Arg Asn His Arg Ala Tyr Arg Leu Thr Val Ala
740 745 750

Lys Leu Glu Pro Pro Leu Ile Pro Phe Met Pro Leu Leu Ile Lys Asp
755 760 765

Met Thr Phe Thr His Glu Gly Asn Lys Thr Phe Ile Asp Asn Leu Val
770 775 780

Asn Phe Glu Lys Met Arg Met Ile Ala Asn Thr Ala Arg Thr Val Arg
785 790 795 800

Tyr Tyr Arg Ser Gln Pro Phe Asn Pro Asp Ala Ala Gln Ala Asn Lys
805 810 815

Asn His Gln Asp Val Arg Ser Tyr Val Arg Gln Leu Asn Val Ile Asp
820 825 830

Asn Gln Arg Thr Leu Ser Gln Met Ser His Arg Leu Glu Pro Arg Arg
835 840 845

Pro

<210> 19
<211> 24
<212> PRT
<213> Caenorhabditis elegans

<400> 19

Phe Val Gln Ala Ser Pro Ser Asp Ile Ser Thr Ser Leu Ser His Ile
1 5 10 15

Asp Tyr Arg Val Leu Ser Arg Ile
20

<210> 20
<211> 43
<212> PRT
<213> Caenorhabditis elegans

<400> 20

Arg Ala Glu Ile Leu Val Lys Phe Val His Val Ala Lys His Leu Arg
1 5 10 15

Lys Ile Asn Asn Phe Asn Thr Leu Met Ser Val Val Gly Gly Ile Thr
20 25 30

His Ser Ser Val Ala Arg Leu Ala Lys Thr Tyr
35 40

<210> 21
<211> 22
<212> PRT
<213> Caenorhabditis elegans

<400> 21

Phe Arg Ile Pro Ile Ile Gly Val His Leu Lys Asp Leu Val Ala Ile
1 5 10 15

Asn Cys Ser Gly Ala Asn
20

<210> 22
<211> 24
<212> PRT
<213> Homo sapiens

<400> 22

Leu His Asp Phe His Ser His Glu Ile Ala Glu Gln Leu Thr Leu Leu
1 5 10 15

Asp Ala Glu Leu Phe Tyr Lys Ile
20

<210> 23
<211> 41
<212> PRT
<213> Homo sapiens

<400> 23

Arg Glu Arg Leu Leu Leu Lys Phe Ile Lys Ile Met Lys His Leu Arg
1 5 10 15

Lys Leu Asn Asn Phe Asn Ser Tyr Leu Ala Ile Leu Ser Ala Leu Asp
20 25 30

Ser Ala Pro Ile Arg Arg Leu Glu Trp
35 40

<210> 24
<211> 22
<212> PRT
<213> Homo sapiens

<400> 24

Pro Cys Ile Pro Tyr Leu Gly Leu Ile Leu Gln Asp Leu Thr Phe Val
1 5 10 15

His Leu Gly Asn Pro Asp
20

<210> 25
<211> 24
<212> PRT

<213> Mus musculus

<400> 25

Leu Leu Asp Ile Asp Pro Tyr Thr Tyr Ala Thr Gln Leu Thr Val Leu
1 5 10 15

Glu His Asp Leu Tyr Leu Arg Ile
20

<210> 26

<211> 43

<212> PRT

<213> Mus musculus

<400> 26

Arg Ser Lys Leu Thr Gln Tyr Phe Val Thr Val Ala Gln His Cys Lys
1 5 10 15

Glu Leu Asn Asn Phe Ser Ser Met Thr Ala Ile Val Ser Ala Leu Tyr
20 25 30

Ser Ser Pro Ile Tyr Arg Leu Lys Lys Thr Trp
35 40

<210> 27

<211> 22

<212> PRT

<213> Mus musculus

<400> 27

Ala Cys Val Pro Phe Phe Gly Val Tyr Leu Ser Asp Leu Thr Phe Thr
1 5 10 15

Phe Val Gly Asn Pro Asp
20

<210> 28

<211> 24

<212> PRT

<213> Rattus rattus

<400> 28

Phe Glu Asn His Ser Ala Met Glu Ile Ala Glu Gln Leu Thr Leu Leu
1 5 10 15

Asp His Leu Val Phe Lys Ser Ile
20

<210> 29
<211> 43
<212> PRT
<213> Rattus rattus

<400> 29

Arg Ala Ser Thr Ile Glu Lys Trp Val Ala Val Ala Asp Ile Cys Arg
1 5 10 15

Cys Leu His Asn Tyr Asn Ala Val Leu Glu Ile Thr Ser Ser Ile Asn
20 25 30

Arg Ser Ala Ile Phe Arg Leu Lys Lys Thr Trp
35 40

<210> 30
<211> 22
<212> PRT
<213> Rattus rattus

<400> 30

Pro Cys Val Pro Tyr Leu Gly Met Tyr Leu Thr Asp Leu Ala Phe Leu
1 5 10 15

Glu Glu Gly Thr Pro Asn
20

<210> 31
<211> 24
<212> PRT
<213> Homo sapiens

<400> 31

Leu Leu Thr Leu His Pro Ile Glu Ile Ala Arg Gln Leu Thr Leu Leu
1 5 10 15

Glu Ser Asp Leu Tyr Arg Ala Val
20

<210> 32
<211> 43
<212> PRT
<213> Homo sapiens

<400> 32

Arg Val Ala Val Val Ser Arg Ile Ile Glu Ile Leu Gln Val Phe Gln
1 5 10 15

Glu Leu Asn Asn Phe Asn Gly Val Leu Glu Val Val Ser Ala Met Asn
20 25 30

Ser Ser Pro Val Tyr Arg Leu Asp Arg Thr Phe
35 40

<210> 33

<211> 23

<212> PRT

<213> Homo sapiens

<400> 33

Pro Pro Cys Val Pro Phe Phe Gly Ile Tyr Leu Thr Asn Ile Leu Lys
1 5 10 15

Thr Glu Glu Gly Asn Pro Glu
20

<210> 34

<211> 24

<212> PRT

<213> Saccharomyces cerevisiae

<400> 34

Ala Leu Asn Val Ser Pro Trp Ser Leu Ala Lys Thr Leu Thr Leu Leu
1 5 10 15

Glu Ser Ser Leu Tyr Leu Asp Ile
20

<210> 35

<211> 43

<212> PRT

<213> Saccharomyces cerevisiae

<400> 35

Gln Thr His Thr Ile Ser Tyr Trp Leu Gln Val Ala Leu Ala Cys Leu
1 5 10 15

Tyr Leu Arg Asn Leu Asn Ser Leu Ala Ser Ile Ile Thr Ser Leu Gln

20

25

30

Asn His Ser Ile Glu Arg Leu Ser Leu Pro Ile
 35 40

<210> 36
 <211> 22
 <212> PRT
 <213> *Saccharomyces cerevisiae*

<400> 36

Pro Cys Val Pro Phe Thr Ser Leu Leu Ile Arg Asp Ile Thr Phe Ile
 1 5 10 15

Arg Asp Gly Asn Asp Thr
 20

<210> 37
 <211> 20
 <212> PRT
 <213> *Caenorhabditis elegans*

<400> 37

Ala Val Phe Lys His Tyr Asp His Asp Arg Asp Gly Phe Ile Ser Gln
 1 5 10 15

Glu Glu Phe Gln
 20

<210> 38
 <211> 20
 <212> PRT
 <213> *Homo sapiens*

<400> 38

Glu Ala Phe Ser Leu Phe Asp Lys Asp Gly Asp Gly Thr Ile Thr Thr
 1 5 10 15

Lys Phe Leu Gly
 20

<210> 39
 <211> 20
 <212> PRT
 <213> *Homo sapiens*

<400> 39

Leu Met Leu Lys Leu Phe Asp Ser Asn Asn Asp Gly Lys Leu Glu Leu
1 5 10 15

Thr Glu Met Ala
20

<210> 40
<211> 20
<212> PRT
<213> Homo sapiens

<400> 40

Phe Ala Phe Arg Ile Tyr Asp Met Asp Lys Asp Gly Tyr Ile Ser Asn
1 5 10 15

Gly Glu Leu Phe
20

<210> 41
<211> 20
<212> PRT
<213> Homo sapiens

<400> 41

Lys Val Phe His Met Leu Asp Lys Asp Lys Ser Gly Phe Ile Glu Glu
1 5 10 15

Asp Glu Leu Gly
20

<210> 42
<211> 20
<212> PRT
<213> Homo sapiens

<400> 42

Glu Cys Phe Arg Ile Phe Asp Arg Lys Ala Asp Gly Tyr Ile Asp Pro
1 5 10 15

Glu Glu Leu Ala
20

<210> 43
<211> 50

<212> PRT
<213> Caenorhabditis elegans

<400> 43

His Asn Phe His Glu Thr Thr Phe Leu Thr Pro Thr Thr Cys Asn His
1 5 10 15

Cys Asn Lys Leu Leu Trp Gly Ile Leu Arg Gln Gly Phe Lys Cys Lys
20 25 30

Asp Cys Gly Leu Ala Val His Ser Cys Cys Lys Ser Asn Ala Val Ala
35 40 45

Glu Cys
50

<210> 44
<211> 50
<212> PRT
<213> Homo sapiens

<400> 44

His Lys Phe Ile Ala Arg Phe Phe Lys Gln Pro Thr Phe Cys Ser His
1 5 10 15

Cys Thr Asp Phe Ile Trp Gly Phe Gly Lys Gln Gly Phe Gln Cys Gln
20 25 30

Val Cys Cys Phe Val Val His Lys Arg Cys His Glu Phe Val Thr Phe
35 40 45

Ser Cys
50

<210> 45
<211> 50
<212> PRT
<213> Homo sapiens

<400> 45

His Lys Phe Thr Ala Arg Phe Phe Lys Gln Pro Thr Phe Cys Ser His
1 5 10 15

Cys Thr Asp Phe Ile Trp Gly Phe Gly Lys Gln Gly Phe Gln Cys Gln
20 25 30

Val Cys Cys Phe Val Val His Lys Arg Cys His Glu Phe Val Thr Phe
 35 40 45

Ser Cys
 50

<210> 46
 <211> 50
 <212> PRT
 <213> Homo sapiens

<400> 46

His Lys Phe Thr Ala Arg Phe Phe Lys Gln Pro Thr Phe Cys Ser His
 1 5 10 15

Cys Thr Asp Phe Ile Trp Gly Ile Gly Lys Gln Gly Leu Gln Cys Gln
 20 25 30

Val Cys Ser Phe Val Val His Arg Arg Cys His Glu Phe Val Thr Phe
 35 40 45

Glu Cys
 50

<210> 47
 <211> 24
 <212> PRT
 <213> Caenorhabditis elegans

<400> 47

Leu His Leu Ile Asp Ser Gln Glu Leu Ala His Gln Leu Phe Leu Phe
 1 5 10 15

His Leu Gln Leu Leu Arg Ser Thr
 20

<210> 48
 <211> 43
 <212> PRT
 <213> Homo sapiens

<400> 48

Arg Val Gln Leu Leu Lys Lys Phe Ile Lys Ile Ala Ala His Cys Lys
 1 5 10 15

Glu Tyr Lys Asn Leu Asn Ser Phe Phe Ala Ile Val Met Gly Leu Ser
20 25 30

Asn Ile Ala Val Ser Arg Leu Ala Leu Thr Trp
35 40

<210> 49
<211> 43
<212> PRT
<213> Caenorhabditis elegans

<400> 49

Arg Met Glu Ile Leu Lys Lys Phe Ile Ser Ile Ala Thr Ile Ala Arg
1 5 10 15

Glu Tyr Arg Asp Leu Leu Thr Val Phe Ala Ile Thr Leu Gly Leu Ser
20 25 30

Met Thr Ser Ile Ser Arg Leu Thr Leu Thr Trp
35 40

<210> 50
<211> 22
<212> PRT
<213> Caenorhabditis elegans

<400> 50

Pro Tyr Ile Pro Phe Val Pro Leu Ile Leu Lys Asp Leu Met Phe Ile
1 5 10 15

His Gln Gly Asn Lys Ser
20

<210> 51
<211> 69
<212> PRT
<213> Caenorhabditis elegans

<400> 51

Val Phe Arg Gln Gly Glu Ile Gly Val Tyr Trp Tyr Ile Val Leu Lys
1 5 10 15

Gly Ala Val Glu Val Asn Val Asn Gly Lys Ile Val Cys Leu Leu Arg
20 25 30

Glu Gly Asp Asp Phe Gly Lys Leu Ala Leu Val Asn Asp Leu Pro Arg
35 40 45

Ala Ala Thr Ile Val Thr Tyr Glu Asp Asp Ser Met Phe Leu Val Val
50 55 60

Asp Lys His His Phe
65

<210> 52
<211> 67
<212> PRT
<213> Homo sapiens

<400> 52

Val Ile Gln Gln Gly Asp Glu Gly Asp Asn Phe Tyr Val Ile Asp Gln
1 5 10 15

Gly Glu Thr Asp Val Tyr Val Asn Asn Glu Trp Ala Thr Val Gly Glu
20 25 30

Gly Gly Ser Phe Gly Glu Leu Ala Leu Ile Tyr Gly Thr Pro Arg Ala
35 40 45

Ala Thr Val Lys Ala Lys Thr Asn Val Lys Leu Trp Gly Ile Asp Arg
50 55 60

Asp Ser Tyr
65

<210> 53
<211> 71
<212> PRT
<213> Homo sapiens

<400> 53

Val Ile Asp Gln Gly Asp Asp Gly Asp Asn Phe Tyr Val Ile Glu Arg
1 5 10 15

Gly Thr Tyr Asp Ile Leu Val Thr Lys Asp Asn Gln Thr Arg Val Gly
20 25 30

Gln Tyr Asp Asn Arg Gly Ser Phe Gly Glu Leu Ala Leu Met Tyr Asn

35

40

45

Thr Pro Arg Ala Ala Thr Ile Val Ala Thr Ser Glu Gly Ser Leu Trp
 50 55 60

Gly Leu Asp Arg Val Thr Phe
 65 70

<210> 54
 <211> 73
 <212> PRT
 <213> Homo sapiens

<400> 54

Ile Val Val Gln Gly Glu Pro Gly Asp Glu Phe Phe Ile Ile Leu Glu
 1 5 10 15

Gly Ser Ala Ala Val Leu Gln Arg Arg Ser Glu Asn Glu Glu Phe Val
 20 25 30

Val Gly Arg Leu Gly Pro Ser Asp Tyr Phe Gly Glu Ile Ala Leu Leu
 35 40 45

Met Asn Arg Pro Arg Ala Ala Thr Val Val Ala Arg Gly Pro Leu Lys
 50 55 60

Cys Val Lys Leu Asp Arg Pro Arg Phe
 65 70

<210> 55
 <211> 79
 <212> PRT
 <213> Homo sapiens

<400> 55

Ile Ile Thr Gln Gly Glu Lys Ala Asp Ser Phe Tyr Ile Ile Glu Ser
 1 5 10 15

Gly Glu Val Ser Ile Leu Ile Arg Ser Arg Thr Lys Ser Asn Lys Asp
 20 25 30

Gly Gly Asn Gln Glu Val Glu Ile Ala Arg His Lys Gly Gln Tyr Phe
 35 40 45

Gly Glu Leu Ala Leu Val Thr Asn Lys Pro Arg Ala Ala Ser Ala Tyr
50 55 60

Ala Val Gly Asp Val Lys Cys Leu Val Met Asp Val Gln Ala Phe
65 70 75

<210> 56
<211> 67
<212> PRT
<213> Homo sapiens

<400> 56

Ile Ile Lys Glu Gly Asp Val Gly Ser Leu Val Tyr Val Met Glu Asp
1 5 10 15

Gly Lys Val Glu Val Thr Lys Glu Gly Val Lys Cys Thr Met Gly Pro
20 25 30

Gly Lys Val Phe Gly Glu Leu Ala Ile Leu Tyr Asn Cys Thr Arg Thr
35 40 45

Ala Thr Val Lys Thr Leu Val Asn Val Lys Leu Trp Ala Ile Asp Arg
50 55 60

Gln Cys Phe
65

<210> 57
<211> 67
<212> PRT
<213> Homo sapiens

<400> 57

Ile Ile Lys Glu Gly Asp Val Gly Ser Leu Val Tyr Val Met Glu Asp
1 5 10 15

Gly Lys Val Glu Val Thr Lys Glu Gly Val Lys Cys Thr Met Gly Pro
20 25 30

Gly Lys Val Phe Gly Glu Leu Ala Ile Leu Tyr Asn Cys Thr Arg Thr
35 40 45

Ala Thr Val Lys Thr Leu Val Asn Val Lys Leu Trp Ala Ile Asp Arg
50 55 60

Gln Cys Phe
65

<210> 58
<211> 67
<212> PRT
<213> Homo sapiens

<400> 58

Ile Ile Lys Gln Gly Glu Pro Gly Asn His Ile Phe Val Leu Ala Glu
1 5 10 15

Gly Arg Leu Glu Val Phe Gln Gly Lys Leu Leu Ser Ser Ile Pro Met
20 25 30

Trp Thr Thr Phe Gly Glu Leu Ala Ile Leu Tyr Asn Cys Thr Arg Thr
35 40 45

Ala Ser Val Lys Ala Ile Thr Asn Val Lys Thr Trp Ala Leu Asp Arg
50 55 60

Glu Val Phe
65